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# Editorial: New insights to coastal zone environmental pollution, ecosystem disturbance and remediation

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## Editorial on the Research Topic

[New insights to coastal zone environmental pollution, ecosystem disturbance and remediation](#)

Global concern over marine environmental pollution has escalated, with rapid advancements in the treatment of marine pollution in recent years. The delicate balance of ecosystems is being swiftly impacted by heightened human activities and coastal development, necessitating the implementation of remediation technologies. Enormous quantities of emerging pollutants were disposed in the estuarine and coastal areas due to rapid urbanization and discharges of domestic effluents, thermal power plant effluent, and industrial disposal. The discharge of pollutants, especially as a result of intensive anthropogenic activities near shorelines, has evolved into a complex issue, emerging as a novel global threat to marine environments and ecologies. However, the severity of this threat has not undergone adequate investigation. The forthcoming challenges of microplastic disposal, disinfectant discharge, rust-resistant coatings and paint treatment as well as intensive industrial activities in inshore areas make marine water treatment complicated. This Research Topic focused on a better understanding of pollution threats on marine ecosystem functioning.

Metal corrosivity and marine-adhesive organisms present in seawater can cause problems in the performance of coastal and offshore facilities. In the process of corrosion prevention, it is required to apply anti-fouling paints on the facilities and periodically clean them with chemicals to control surface contamination by marine organisms. In this process, residues of paints/chemicals, corroded metal particles, marine microbial colonies, and marine larvae are emitted to the sea, leading to marine pollution and ecosystem disturbances. Nevertheless, despite the seriousness of marine pollution and concerns related to ship hull cleaning, there has been a notable absence of thorough investigations, with increasing focus on international regulatory measures in recent times (Kim et al., 2024).

In this Research Topic, behavioral and transcriptomic analyses to acquire a more clear scenario of the inhibitory mechanisms of butenolide compound on the larval settlement have been highlighted by [Liang et al.](#) Microplastics in the marine environment have the potential to transport harmful chemical pollutants as a result of their high adsorption capacity and bioaccumulation. Metagenome and metabonomics analysis showed that microplastic (fibrous black plastic and film white plastic) settled in the Shenzhen coastal watershed area had an impact on the microbial diversity in sediments, and the structure and composition of the microbial communities ([Zhang and Liu](#)). The mixture exposure of polyethylene microplastics and 4-nonylphenol on fish carp induced histological alterations in most studied tissues and post-exposure improve the cellular and tissue structure ([Ammar et al.](#)). Similarly, the release of treated ballast water into the marine environment provides an emerging environmental concern. Recently, [Lee et al.](#) elaborated the general mechanisms by which physicochemical factors affect the formation of disinfection byproducts during electrolysis treatment of ballast water. The Research Topic has also concentrated on exploring the consequences of marine pollution, hull cleaning, microplastic disposal, industrial discharge and treatment, as well as technologies related to bioremediation.

Ongoing research continues to explore marine pollution remediation, employing various methods such as bioremediation, artificial reefs, electrocoagulation, and the application of nanotechnology to counteract the repercussions of marine contamination. Tackling marine pollution is a multifaceted challenge necessitating collaborative endeavors from governments, industries, and the scientific community. The complicating factor of climate change further amplifies the issue, with rising sea levels and ocean acidification intensifying the adverse effects of contaminants on marine life. Looking ahead, the combined efforts of marine

research, governmental policies, heightened public awareness, and responsible actions have the potential to foster more sustainable and healthy marine ecosystems.

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## Conflict of interest

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